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MERED, HABTE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/915,332	Applicant(s) DUPLAIX ET AL.
	Examiner Habte Mered	Art Unit 2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30,35,38-41 and 50-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30,35,38-41 and 50-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

A. The amendment filed on 13 March 2006 has been entered and fully considered.

B. Claims 42-49 are cancelled by the amendment filed on 13 March 2006. Claims 31-34 and 36-37 are cancelled by the amendment filed on 23 September 2005.

C. Claims 1-30, 35, 38-41, and 50-58 are pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-7, 22-25, 30, 50, 51, and 56** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi et al (US 6, 577, 634), hereinafter referred to as Tsukakoshi, in view of Ichinohe et al (US 6, 370, 653), hereinafter referred to as Ichinohe.

Tsukakoshi discloses a router device with route calculation units and forwarding units.

3. Regarding **claim 1**, Tsukakoshi discloses a router device with route calculation units and forwarding units. The route calculation unit has a CPU and memory and has two or more routing protocol means to handle different types of protocols. Similarly the forwarding unit has a CPU as a forwarding processor and a memory unit. The router device's forwarding unit serves as the I/O unit and interfaces with external devices. The

routing calculation unit constitutes the routing layer while the forwarding unit defines the I/O layer. The router device disclosed by Tsukakoshi is in effect a clustered router and appears to other external routers and communication terminals as a single network forwarding apparatus. **(See Column 3, Lines 62-67)**

Tsukakoshi discloses a router supporting multiple routing protocols **(See Column 3, Lines 18-20; Figure 1 element 15; Each routing calculation unit can handle two different routing protocols),** the router comprising:

a. an interface layer including a plurality of I/O controllers, each I/O controller implementing an I/O port; **(See Figure 1, element 18; Figure 4, element 18;Column 4, Lines 53-64; Each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

b. a switching layer in communication with the interface layer for selectively establishing signal pathways between I/O ports; **(See Figure 4, element 46; Column 4, Line 40)**

c. a routing layer in communication with the interface layer, and the routing layer including a plurality of routing protocol computing entities, each routing protocol computing entity being associated with respective set of at least one routing protocol and including: **(Tsukakoshi discloses each router entity 12 in Figure 1 contains two or more routing protocol means 15 as shown in Figure 1. See Column 3, Line 19. Further, Tsukakoshi shows that each router entity 12 in Figure 1 can contain more than two routing protocol means 15 which can easily be verified in Figure 3**

that there are three running different protocols – protocol A, B, and C. See Column 2, Lines 37-38 and Column 14, Lines 13-20.)

i. a respective CPU **(See element 41, Figure 4)**;

ii. a respective data storage medium in communication with the CPU **(See element 42, Figure 4)**;

iii. and storing program data executed by the CPU **(it is inherent for any processor designed to execute a series of procedures to store the instructions for executing the procedures in memory and in this case the program data has to be stored in the storage medium shown in Figure 4 as element 42);**

d. to cause the routing protocol computing entity to effect management of one or more peering sessions with remote routing devices according to the at least one routing protocol in the set associated with the routing protocol computing entity. **(Applicant on page 7, Line 6 of the specification defines peering session to be a communication session between two different routers. Tsukakoshi discloses the clustered router is seen as a single entity by external devices like router 25 in Figure 1. Tsukakoshi further discloses that a communication or peering session can be established between the clustered router and any device like router 25 to continuously exchange packets. Each router unit in the clustered router can have a peering session with remote devices using the first and/or second protocol means. See also Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5. It has already been established that Tsukakoshi's clustered**

router device can run any subset of routing protocols from a common set of routing protocols used in the art of networking.)

4. Regarding **claim 23**, Tsukakoshi discloses a router, comprising:

a. an interface layer including a plurality of I/0 controllers, each I/O controller implementing an I/O port (**See Figure 1, element 18; Figure 4, element 18;Column 4, Lines 53-64; Each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

b. a switching layer in communication with the interface layer for selectively establishing signal pathways between the I/O ports **(See Figure 4, element 46; Column 4, Line 40);**

C. a routing layer in communication with the interface layer, the routing layer including a plurality of routing protocol computing entities, each routing protocol computing entity being associated with a respective routing protocol **(See Column 4, Lines 39-52)** and including:

i. a respective CPU **(See element 41, Figure 4)**;

ii. a respective data storage medium in communication with the CPU **(See element 42, Figure 4)**; and storing program data for execution by the CPU **(it is inherent for any processor designed to execute a series of procedures to store the instructions for executing the procedures in memory and in this case the program data has to be stored in the storage medium shown in Figure 4 as**

element 42) to cause the routing protocol computing entity to effect management of one or more peering sessions with remote routing devices according to the routing protocol associated with the routing protocol computing entity **(Tsukakoshi discloses the clustered router is seen as a single entity by external devices like router 25 in Figure 1. Tsukakoshi further discloses that a communication or peering session can be established between the clustered router and any device like router 25 to continuously exchange packets. Each router unit in the clustered router can have a peering session with remote devices using the first and/or second protocol means. See also Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5.)**, the management of one or more peering sessions comprising maintaining in the data storage medium one or more route databases **(See Figure 1, elements 17; See Column 8, Lines 48-50 and Column 3, Lines 20-26; Tsukakoshi shows that each routing protocol means that runs a specific routing protocol during a peering session extracts specific network routing information and puts it in element 16 of Figure 1 and then creates a routing table)**.

5. With respect to **claims 1 and 23**, Tsukakoshi fails to disclose a router having a set of routing protocol entities wherein each routing protocol entity is associated with a different routing protocol.

Ichinohe discloses a router with several routing protocol processing units.

Ichinohe teaches a router having a set of routing protocol entities wherein each routing protocol entity runs a different routing protocol. **(See Column 4, Lines 4-7 and 30-43. See also in Figures 1, 10, 12, and 14, processors 113, 114, 203, and 204 are**

routing protocol entities and as illustrated in Column 5, Lines 27-31 the protocol OSPF is run on processors 114 and 204 and the protocol RIP is run on processors 113 and 203.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use routing protocol entities where each entity runs a different routing protocol. The motivation being it provides modularity by isolating a given protocol to a specific processor as further illustrated by Ichinohe in Column 2, Lines 22-27.

6. Regarding **claim 2**, Tsukakoshi discloses a router wherein each routing protocol computing

entity is operative to maintain simultaneously a plurality of peering sessions with remote routing devices. **(Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5)**

7. Regarding **claim 3**, Tsukakoshi discloses a router wherein each routing protocol computing entity is operative to exchange data with a remote routing device through the I/O interface layer during a peering session. **(Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5)**

8. Regarding **claim 4**, Tsukakoshi discloses a router, wherein the peering session includes a transfer of route information data from the router to a remote routing device. **(Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5)**

9. Regarding **claim 5**, Tsukakoshi discloses a router, wherein the peering session includes a transfer of route information data from the remote routing device to the router. **(Column 2, Lines 11-15; Column 3, Lines 62-67; and Column 4, Lines 1-5)**

10. Regarding **claim 6**, Tsukakoshi disclose a router, wherein the data storage medium **(element 42 in Figure 4)** of at least one of the plurality of routing protocol computing entities, stores a local routing table **(element 17, in Figure 1)** holding at least one inbound route database derived at least in part from route information data transferred from a remote routing device **(element 25 in Figure 1)** to the router. **(Column 3, Lines 23-27;Column 4, Lines 44-52)**

11. Regarding **claim 7**, Tsukakoshi discloses a router wherein at least one of the plurality of routing protocol computing entities is operative to apply an inbound policy processing on the route information data transferred from a remote routing device during generation of at least one inbound route database. **(Column 3, Lines 23-27;Column 4, Lines 44-52; This is strictly a function of the routing protocol. This is implemented with a policy based routing protocol like BGP. Tsukakoshi's device can work with any routing protocol including BGP. Further Examiner takes Official Action on that a BGP is a policy based routing protocol.)**

12. Regarding **claims 22, 50 and 51**, Tsukakoshi discloses a router; wherein the subset of protocols associated with the first routing protocol computing entity is different from the subset of protocols associated with the second routing protocol and further discloses any protocol can be used and mentions the RIP protocol as an example.

(Column 3, Lines 18-23; Column 6, Lines 1-10; Tsukakoshi's router is not limited by the type of the routing protocol chosen.)

Tsukakoshi, however, fails to expressly disclose that routing protocols can be OSPF and BGP. Further, Tsukakoshi fails to expressly disclose that only one routing protocol can run on a protocol computing entity. Even further, Tsukakoshi's fails to disclose two protocol computing entities can have mutually exclusive sets of protocols.

Ichinohe discloses that routing protocols can be OSPF and BGP. Ichinohe discloses that only one routing protocol running on a protocol computing entity. Ichinohe discloses two protocol computing entities can have mutually exclusive sets of protocols **(See Column 54, Lines 4-7 and 30-43 and Column 5, Lines 20-27. See also in Figures 1, 10, 12, and 14, processors 113, 114, 203, and 204)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use OSPF and BGP as routing protocols. The motivation being it provides peering sessions with networks based on these protocols and such sessions with these networks are beneficiary as theses networks running OSPF and BGP protocols are widely deployed and make up part of what is known as the Internet.

13. Regarding **claims 24, 30, and 56**, Tsukakoshi discloses a router, wherein the first routing protocol and the second routing protocol are distance vector protocols. **(Column 3, Lines 18-23; Column 6, Lines 1-10; Tsukakoshi's router is not limited by the type of the routing protocol chosen.)**

14. Regarding **claim 25**, Tsukakoshi discloses a router, wherein the first routing protocol and the second routing protocol are link state protocols. **(Column 3, Lines 18-23; Column 6, Lines 1-10; Tsukakoshi's router is not limited by the type of the routing protocol chosen.)**

15. **Claims 8-21, 52-55, 57, and 58** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi in view of Ichinohe as applied to claim 5 above, and further in view of Basso et al (US 7, 003, 582), hereinafter referred to as Basso.

16. Regarding **claim 8**, the combination of Tsukakoshi and Ichinohe discloses a router wherein the data storage medium of at least one of the plurality of routing protocol computing entities stores a routing table that holds a best route database, at least one routing protocol computing entity being operative to apply an outbound policy processing on its best route database to generate at least one outbound route database, at least one routing protocol computing entity being operative to transfer route information data from the outbound route database to a remote routing device. **(Tsukakoshi Column 3, Lines 23-27;Column 4, Lines 44-52;This is strictly a function of the routing protocol. This is best implemented with a policy based routing protocol like BGP. Tsukakoshi's device can work with any routing protocol including BGP. Further Examiner takes Official Action on that a BGP is a policy based routing protocol.)**

17. Regarding **claim 9**, the combination of Tsukakoshi and Ichinohe discloses, wherein the data storage medium **(element 42, Figure 4)** of each routing protocol computing entity stores a routing table **(element 17, Figure 1)** holding at least one

inbound route database derived from route information data transferred from a remote routing device **(Tsukakoshi element 25, Figure 1)** to the router. **(Column 3, Lines 23-27, Column 4, Lines 44-52)**

18. Regarding **claim 10**, the combination of Tsukakoshi and Ichinohe discloses a router, wherein each routing protocol computing entity is operative to apply an inbound policy processing on the route information data transferred from a remote routing device during generation of at least one inbound route database. **(Tsukakoshi Column 3, Lines 23-27;Column 4, Lines 44-52;This is strictly a function of the routing protocol. This is implemented with a policy based routing protocol like BGP. Tsukakoshi's device can work with any routing protocol including BGP. Further Examiner takes Official Action on that a BGP is a policy based routing protocol.)**

19. Regarding **claim 11**, the combination of Tsukakoshi and Ichinohe discloses a router, wherein the routing table of the routing protocol computing entity holds a best route database, the routing protocol computing entity being operative to apply an outbound policy processing on the best route database to generate at least one outbound route database, each routing protocol computing entity being operative to transfer route information data from the outbound route database to a remote routing device. **(Tsukakoshi Column 3, Lines 23-27;Column 4, Lines 44-52; This is strictly a function of the routing protocol. This is best implemented with a policy based routing protocol like BGP. Tsukakoshi's device can work with any routing protocol including BGP.)**

20. With respect to **claims 8, 9, 10, and 11**, the combination of Tsukakoshi and Ichinohe fails to expressly teach a router that has a routing protocol computing entity with its own local routing table.

Basso teaches a scalable router.

Basso teaches a router that has a routing protocol computing entity with its own local routing table. **(See Figure 2, element 28 and Column 3, Lines 22-25)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combination of Tsukakoshi's and Ichinohe's router by using a routing protocol computing entity with its own local routing table. The motivation being it further enhances modularity by isolating a given protocol to a specific processor and limits the failure recovery impact of the computing means in that only the local data associated with the computing entity is rebuilt as detailed in Basso in Column 3, Lines 44-49.

21. Regarding **claim 12**, Tsukakoshi discloses, wherein the routing layer includes a control computing entity in data communicative relationship with each routing protocol computing entity (**See Column 4, Lines 39-52**), and the control computing entity includes:

a. a CPU **(See element 41 in Figure 4)**;

b. a data storage medium in communication with the CPU **(See element 42 in Figure 4)**;

C. a program data for execution by the CPU**(it is inherent for any processor designed to execute a series of procedures to store the instructions for the**

program executions in memory and in this case the program data has to be stored in the storage medium shown in Figure 4 as element 42);

d. a master routing table stored in the data storage medium **(See element 17 in Figure 1; Column 4, Lines 50-52).**

22. Regarding **claim 13**, Tsukakoshi discloses a router, wherein the program data stored in the data storage medium of the control computing entity implements a routing table manager for managing the master routing table. **(It is inherent for any processor designed to execute a series of procedures to store the instructions for the program executions in memory and in this case the program data has to be stored in the storage medium shown in Figure 4 as element 42. The routing table has to be managed by the program data to determine when to read from and write to the table)**

23. Regarding **claim 14**, Tsukakoshi discloses a router, wherein each routing protocol computing entity is in communication with the control computing entity to transfer to the data storage medium of the control computing entity data from at least one inbound route database in the routing protocol computing entity. **(Column 3, Lines 18-27)**

24. Regarding **claim 15**, Tsukakoshi discloses a router, wherein the routing table manager is operative to apply a master policy processing on data received from the inbound route database in each routing protocol computing entity to generate the master routing table. **(Column 3, Lines 31-57; In Tsukakoshi's clustered router each routing table is a master routing table as each table gets updated with new route**

info using the NISP protocol. In case of failure the routing table located in the backup unit will be up to date when the unit is activated)

25. Regarding **claim 16**, Tsukakoshi discloses a router, wherein the master policy processing includes merging the data in the inbound route databases from at least two of the routing protocol computing entities to produce merged inbound routing data. **(If the routing protocol is the same for the two entities then the data has to be merged and if the protocols are different the occurrence of a uniform merging is not necessarily true. This is also a function of policy based routing protocols like the BGP.)**

26. Regarding **claim 17**, Tsukakoshi discloses a router, wherein the merged inbound routing data includes information mapping destinations and routes to the destinations. **(Column 3, Lines 23-27; This is standard information contained in most routing data.)**

27. Regarding **claim 18**, Tsukakoshi discloses a router, wherein the merged inbound routing data includes a plurality of destinations and a set of routes associated with each destination of the plurality of destinations, the master policy processing includes discarding from each set of routes a plurality of routes and retaining only a subset of the set of routes. **(This is strictly a function of the routing protocol chosen. Tsukakoshi's clustered can accommodate any routing protocol. For instance BGP is a policy based routing protocol that selects best routes on the values of the BGP attributes and Examiner takes Official Action on this issue.)**

28. Regarding **claim 19,** Tsukakoshi discloses a router, wherein the control computing entity is operative to transfer to the data storage medium of the first one of the routing protocol computing entities at least a portion of the master routing data to form the best route database in the data storage medium of the first routing protocol computing entities. **(See Column 3, Lines 18-20; Note that determining the best route is a function of the routing protocol like BGP and not the actual router)**

29. Regarding **claim 20**, Tsukakoshi discloses a router, wherein the control computing entity is operative to transfer to the data storage medium of a second one of the routing protocol computing entities at least a portion of the master routing data to form the best route database in the data storage medium of the second one of the routing protocol computing entities. **(See Column 3, Lines 18-20; Note that determining the best route is a function of the routing protocol like BGP and not the actual router.)**

30. Regarding **claim 21**, Tsukakoshi discloses a router, wherein each I/O controller includes a forwarding processor, when a data packet is received at the I/O controller, the forwarding processor determines an I/0 port of the interface layer through which the data packet is to be released, where the forwarding processor including a data storage medium holding a forwarding table, and the forwarding table includes data derived from the master routing table. **(Column 4, Lines 53-64)**

31. Regarding **claims 52 and 54**, the combination of Tsukakoshi and Ichinohe discloses a router layer, comprising: a control computing entity in data communicative relationship with each routing protocol computing entity, the computing entity including:

i. a CPU**(See Tsukakoshi element 41, Figure 4)**;

ii. a data storage medium in communication with the CPU of the control computing entity**(See Tsukakoshi element 42, Figure 4)**;

iii. a master routing table stored in the data storage medium of the control computing entity, where the master routing table holding a master routing database derived at least in part from the inbound routing database of the first routing protocol computing entity and from the inbound routing database of the second routing protocol computing entity**(See Tsukakoshi element 17 in Figure 1; Column 4, Lines 50-52; Column 3, Lines 20-30 and Column 10, Lines 20-25)**;

iv. program data in the data storage medium of the control computing entity for execution by the CPU of the control computing entity to implement a main routing table manager to manage the master routing table **(it is inherent for any processor designed to execute a series of procedures to store the instructions for the program executions in memory and in this case the program data has to be stored in the storage medium shown in Figure 4 as element 42. The routing table has to be managed by the program data to determine when to read from and write to the table. However, Ichinohe teaches expressively a routing table manager in Figure 1 with elements 103 and 104.)**;

a backup computing entity, in data communicative relationship with the first and second routing protocol computing entities and with the control computing entity **(See**

Tsukakoshi Figure 18; Column 10, Lines 6-25), and the backup computing entity includes:

i. a CPU**(See element 41, Figure 4)**;

ii. a data storage medium in communication with the CPU of the backup computing entity**(See element 42, Figure 4)**;

iii. program data in the data storage medium of the backup computing entity for execution by the CPU of the backup computing entity to implement a main routing table manager **(it is inherent for any processor designed to execute a series of procedures to store the instructions for the program executions in memory and in this case the program data has to be stored in the storage medium shown in Tsukakoshi Figure 4 as element 42. The routing table has to be managed by the program data to determine when to read from and write to the table)**;

iv. the backup computing entity being responsive to an operational failure of the control computing entity **(See Tsukakoshi Column 10, Lines 30-60)** to:

1. download the inbound routing databases from each routing protocol computing entities**(Tsukakoshi Column 10, Lines 48-53)**;

2. re-build the master routing database at least in part from the inbound routing databases downloaded from each routing protocol computing entities **(See Tsukakoshi Column 10, Lines 53-57)**.

32. Regarding **claims 53 and 55**, the combination of Tsukakoshi and Ichinohe discloses a router layer, comprising: a control computing entity in data communicative

relationship with each routing protocol computing entity, the computing entity including: **(See Tsukakoshi Column 4, Lines 39-52)**

i. a respective CPU **(See Tsukakoshi element 41, Figure 4)**;

ii. a respective data storage medium in communication with the CPU**(See Tsukakoshi element 42, Figure 4)**;

iii. a master routing table stored in the data storage medium of the control computing entity, where the master routing table holding a master routing database derived at least in part from the inbound routing database of the first routing protocol computing entity and from the inbound routing database of the second routing protocol computing entity**(See Tsukakoshi element 17 in Figure 1; Column 4, Lines 50-52; Column 3, Lines 20-30 and Column 10, Lines 20-25)**;

a backup computing entity, in data communicative relationship with the first and second routing protocol computing entities and with the control computing entity **(See Tsukakoshi Figure 18; Column 10, Lines 6-25),** and the backup computing entity includes:

i. a CPU**(See Tsukakoshi element 41, Figure 4)**;

ii. a data storage medium in communication with the CPU of the backup computing entity**(See Tsukakoshi element 42, Figure 4)**;

iii. the backup computing entity being responsive to an operational failure of the control computing entity **(See Tsukakoshi Column 10, Lines 30-60)** to:

1. transfer information from the master routing table to the data storage medium of the backup computing entity to re-build at least partially the local routing table of the first routing protocol computing entity**(See Column 10, Lines 33-36; Tsukakoshi discloses that the active-state route calculation unit sends update information to the backup-state route calculation unit. When the backup-state becomes active it is able to re-build the routing table as it has all the necessary updates till the last moment before the active unit failed. Also worth noting that in Tsukakoshi's system the active unit routing table and the backup unit routing table are always synchronized and up to date and can all be considered as the universal master routing tables.)**

2. enable the program data in the data storage medium of the backup computing entity to effect management of one or more peering sessions with remote routing devices according to a first routing protocol. **(It has already been established by Tsukakoshi that the clustered router can have a peering session with remote devices using the first and/or second protocol means. The backup computing entity will not establish any peering session when it is on stand by mode as it is a spare entity. However, once the backup unit becomes an active computing entity it can readily establish a peering session with external devices using steps taught by Tsukakoshi. See also**

Column 2, Lines 11-15; Column 3, Lines 62-67; Column 4, Lines 1-5; Column 10, Lines 6-25);

33. With respect to **claims 52-55**, the combination of Tsukakoshi and Ichinohe fails to expressly teach a router that has a routing protocol computing entity with its own local routing table.

Basso teaches a router that has a routing protocol computing entity with its own local routing table. **(See Figure 2, element 28 and Column 3, Lines 22-25)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combination of Tsukakoshi's and Ichinohe's router by using a routing protocol computing entity with its own local routing table. The motivation being it further enhances modularity by isolating a given protocol to a specific processor and limits the failure recovery impact of the computing means in that only the local data associated with the computing entity is rebuilt as detailed in Basso in Column 3, Lines 44-49.

34. Regarding **claims 57 and 58**, Tsukakoshi discloses a router wherein the routing protocol associated with the first one of the routing protocol computing entities is the same as the routing protocol associated with the second one of the routing protocol computing entities. **(Column 3, Lines 18-23; Column 6, Lines 1-10; Tsukakoshi's router is not limited by the type of the routing protocol chosen.)**

35. **Claims 26-29** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi in view of Ichinohe as applied to claim 23 above, and further in view of Anderson et al (US Pub. 2003/0014665), hereinafter referred to as Anderson.

36. Regarding **claim 26,** the combination of Tsukakoshi and Ichinohe discloses all aspects of the claimed invention as set forth in the rejection of claim 24 but does not disclose how at least one of the remote devices forming a peering session with the first routing protocol computing entity can be prevented from forming any peering session with the second routing protocol entity.

Anderson teaches how to provide a secure and automated response to a denial of service attacks in a router.

Anderson discloses how the Border Gateway Protocol security features allow a router to implement authenticating and filtering mechanism, wherein the first routing protocol computing entity is capable of establishing peering sessions with a first set of remote routing devices, the second routing protocol computing entity is capable of establishing peering sessions with a second set of remote routing devices, the first set of remote routing devices excluding at least one routing device that belongs to the second set of routing devices. **(See Figure 4, element 340 and see paragraphs 40-42 and 50-53. Anderson establishes how authentication and filtering can be implemented at the routing protocol level using features of BGP and DDOS squelch protocols.)**

37. Regarding **claim 27,** the combination of Tsukakoshi and Ichinohe discloses the aforementioned invention but does not disclose how the remote devices forming a peering session with the first routing protocol computing entity can be prevented from forming any peering session with the second routing protocol entity.

Anderson discloses how the Border Gateway Protocol security features allow a router such that the first set of remote routing devices forming a peering session can exclude any remote routing device from the second set. **(See Figure 4, element 340 and see paragraphs 40-42 and 50-53. Anderson establishes how authentication and filtering can be implemented at the routing protocol level using features of BGP and DDOS squelch protocols.)**

38. Regarding **claim 28,** the combination of Tsukakoshi and Ichinohe discloses the aforementioned invention but does not disclose how the remote devices forming a peering session with the first and second routing protocol computing entity can be mutually exclusive sets.

Anderson discloses how the Border Gateway Protocol security features allows a router such that the first set of remote routing devices forming a peering session can be mutually exclusive with the second set. **(See Figure 4, element 340 and see paragraphs 40-42 and 50-53. Anderson establishes how authentication and filtering can be implemented at the routing protocol level using features of BGP and DDOS squelch protocols.)**

39. Regarding **claim 29,** the combination of Tsukakoshi and Ichinohe discloses the aforementioned invention but does not disclose how the remote devices from different areas forming a peering session with the first and second routing protocol computing entity can be mutually exclusive sets.

Anderson discloses how the Border Gateway Protocol security features allow a router such that the first routing protocol computing entity is capable of establishing

peering sessions with remote routing devices from a first area, the second routing protocol computing entity is capable of establishing peering sessions with remote routing devices from a second area, the first area being different from the second area.

(See Figure 4, element 340 and see paragraphs 40-42 and 50-53. Anderson establishes how authentication and filtering can be implemented at the routing protocol level using features of BGP and DDOS squelch protocols. BGP is a real inter-autonomous system routing protocol. That is, it specifies how routing information is exchanged both between two computing entities running BGP protocol in different autonomous systems, and also between two computing entities within a single autonomous system. Therefore, the first set of remote routing devices can belong to one autonomous system and the second set can belong to a different autonomous system allowing BGP to enforce the exclusion. In addition Anderson teaches that DDOS squelch protocol can be used for authentication and filtering.)

40. With respect to **claims 26-29**, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combination of Tsukakoshi's and Ichinohe's routers to use the Border Gateway Protocol with the advanced security features as the routing protocol, the motivation being BGP V-4 has been widely adopted as the protocol for inter-autonomous communications.

41. **Claim 35** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi et al (US 6, 577, 634), hereinafter referred to as Tsukakoshi, in view of Anderson et al (US Pub. 2003/0014665), hereinafter referred to as Anderson.

Tsukakoshi teaches a router, comprising:

a. an interface layer including a plurality of I/O controllers, each I/O controller implementing an I/O port (**See Figure 1, element 18; Figure 4, element 18;Column 4, Lines 53-64; Each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

b. a switching layer **(See Figure 1, element 13 and Figure 4, element 46)** in communication with the interface layer for selectively establishing signal pathways between the I/O ports **(See Figure 1, element 13; Figure 4, elements 18 and 46; See Column 4, Lines 39-43 to see how the switch layer interfaces with the forwarding units that act as I/O controllers. Column 4, Lines 53-64 indicates that each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

c. a routing layer **(Figure 1, element 20)** in communication with the interface layer **(Figure 1, element 18)**, the routing layer being capable of managing at least one peering session with a remote routing device, **(See Figures 10-13)** the peering session including the exchange of messages with the remote routing device through one of the I/O controllers **(Figure 2 and Column 3, Lines 58-67)**, the peering session being comprised of plurality of tasks **(See Figure 3 and Column 4, Lines 13-38)**;

d. the one I/O controller implementing a peer session assist module, **(This limitation is inherent because Tsukakoshi discloses like any router uses its Forwarding Unit that act as I/O controller to communicate with another remote router and there has to be peering session assist modules.)**

e. the peering session assist module being capable of performing some of the tasks of the peering session autonomously from the routing layer, **(This limitation is true in Tsukakoshi's system because the routing layer (Figure 1, element 20) and the I/O controller (i.e. Forwarding Units – Figure 1, element 18) are independent entities)**

f. the routing layer being capable of performing tasks of the peering session other than the tasks performed by the peering session assist module. **(This limitation is true in Tsukakoshi's system because the routing layer (Figure 1, element 20) and the I/O controller (i.e. Forwarding Units – Figure 1, element 18) are independent entities)**

Tsukakoshi does not disclose the tasks performed by the peering session assist module include authenticating messages received from the remote routing device.

Anderson discloses how the Border Gateway Protocol security features allow a router such that the tasks performed by the peering session assist module include authenticating messages received from the remote routing device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use the Secure Border Gateway Protocol with the advanced security features as the routing protocol to facilitate authenticating messages received from the remote routing device, the motivation being to minimize security vulnerabilities.

42. **Claims 38 and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi et al (US 6, 577, 634), hereinafter referred to as Tsukakoshi, in view of Fukushima et al (US 6, 049, 524), hereinafter referred to as Fukushima and Basso et al (US 7, 003, 582), hereinafter referred to as Basso.

43. Regarding **claim 38**, Tsukakoshi teaches a router, comprising:

a. an interface layer including a plurality of I/O controllers, each I/O controller implementing an I/O port **(See Figure 1, element 18; Figure 4, element 18;Column 4, Lines 53-64; Each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

b. a switching layer in communication with the interface layer for selectively establishing signal pathways between the I/O ports **(See Figure 1, element 18; Figure 4, element 18;Column 4, Lines 53-64; Each forwarding unit acts as an I/O controller determining what to transmit, re-transmit, accept and reject from the incoming and outgoing packet traffic. Each forwarding unit has to have at least one I/O interface or port to send to and receive packets from external routers like router 25 in Figure 1)**;

c. a routing layer in communication with the interface layer **(See Column 4, Lines 39-52)**;

Tsukakoshi, however, fails to expressly disclose that a routing protocol implemented in a route calculating entity can be a Link State protocol.

Basso teaches that a routing protocol implemented in a route calculating entity can be a Link State protocol. **(OSPF is a link state protocol and is shown in Figure 2, element 26. See also Column 3, Lines 22-25)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use routing protocol entities where each entity runs a link state protocol such as OSPF. The motivation being it provides modularity by isolating a given protocol to a specific processor and OSPF is the most widely deployed link state protocol.

Tsukakoshi, however, fails to disclose I/O controller implementing an LSA entity including an LS database.

Fukushima teaches a multiplex router device, shown in figure 2, and it is identical to that of Tsukakoshi's clustered router device, which is shown in Figure 14. Fukushima teaches that his system can implement Link State protocol as one of the routing protocols and is indicated by element 22 in Figure 2. **(See also Column 5, Lines 50-75 and Column 6, Lines 1-5)**

Fukushima discloses each I/O controller **(i.e. Forwarding Unit)** implements an LSA entity, where the LSA entity includes an LS database **(See Element 19 in Figure 2; Column 6, Lines 7-11; Since Fukushima teaches that the routing protocol is a link state protocol there has to be an LSA entity in both the router and I/O Controller layer)**, and the LSA entity is responsive to an LSA message from a remote routing device **(Column 1, Lines 53-57)** including LS information to:

i. update the LS database **(Column 1, Lines 66-67 and Column 2, Lines 1-7)**;

ii. forward the LS information to the routing layer **(Column 2 Lines 1-20 and 32-43)**;

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use the link state protocol as the routing protocol with the I/O controller implementing an LSA entity including an LS database, the motivation being to minimize the amount of information being sent to the standby mode routing calculation unit. If the link state protocol is used as the routing protocol then only the link state information can be sent to the routing calculation unit in standby mode thereby minimizing internal traffic between the active and standby units as further discussed in Fukushima Column 4, Lines 34-38.

44. Regarding **claim 41**, Tsukakoshi teaches all aspects of the claimed invention as set forth in the rejection of claim 38 but fails to teach a routing layer that includes a main control computing entity and a backup computing entity with each entity with its own routing table manager.

Fukushima teaches a routing layer that includes <u>a main control computing entity</u> and <u>a backup computing entity</u> with each entity with its own routing table manager. Specifically Fukushima teaches a router, wherein the routing layer includes:

a. a control computing entity in data communicative relationship with each I/O controller **(element 13 in Figure 14)**, where the control computing entity**(element 11 in Figure 14)**, includes:

i. a CPU **(element 40 in Fig.14)**;

ii. a data storage medium in communication with the CPU **(element 41 in Figure 14)**;

iii. a master routing table stored in the data storage medium, where the master routing table holding a master routing database derived at least in part from the LS database of at least one of the I/O controllers **(elements 19 in Figure 2; Column 2, Lines 4-7 and 40-42; Column 5, Lines 51-67 and Column 6, Lines 1-11)**;

iv. a program data in the data storage medium to implement a main routing table manager to manage the master routing table **(element 18 in Figure 2; Column 5, Line 66)**;

b. a backup computing entity in data communicative relationship with at least one of the I/O controller, where the backup computing entity **(Column 7, Lines 30-45; Fukushima discloses that the backup or standby computing entity is identical to the active entity shown in Figure 2. Therefore the active and backup entities have identical hardware setup.)** including:

i. a CPU **(element 40 in Fig.14)**;

ii. a data storage medium in communication with the CPU of the backup computing entity; **(element 41 in Fukushima's figure 14)**;

iii. program data in the data storage medium of the backup computing entity for execution by the CPU of the backup computing entity to implement a main routing table manager **(element 18 in Fukushima's Figure 2; Column 5, Line 66)**;

iv. the backup computing entity being responsive to an operational failure of the control computing entity **(Column 7, Lines 46-52)** to:

1. transfer information from at least one of the I/O controllers to re-build the LS database **(Column 7, Lines 53-67)**;

2. enable the program data in the data storage medium of the backup computing entity to act as a main routing table manager **(Column 7, Lines 46-52; Once the standby unit becomes active it becomes the main routing table manager**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Tsukakoshi's clustered router to use a routing layer that includes <u>a main control computing entity</u> and <u>a backup computing entity</u> with each entity with its own routing table manager, the motivation being minimizing communication disruptions when a computing entity experiences failure.

45. **Claims 39 and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukakoshi, in view of Fukushima and Basso as applied to claim 38, in further view of Zinin et al (US 6, 820, 134), hereinafter referred to as Zinin.

46. Regarding **claim 39**, the combination of Tsukakoshi, Basso, and Fukushima teaches all aspects of the claimed invention as set forth in the rejections of claim 38 including the existence of an LSA entity. However the modified invention of Tsukakoshi, Basso, and Fukushima fails to teach that, the router upon receiving an LSA message, it will verify whether the LS information is present or not in the LS database and consequently takes appropriate action.

Zinin teaches that when an entity receives an LSA message then it needs to check whether the LS information is present or not in the LS database and update the database if the info exists or discard the LSA if the info already exists in the LS database. **(Column 8, Lines 59-60 and Column 11, Lines 5-10)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the modified invention of Tsukakoshi's, Basso's and Fukushima's clustered router to use the link state protocol as the routing protocol and verify if the LS information is present in the LS database, the motivation being minimizing the amount of information being sent to the router. If the link state protocol is used as the routing protocol then only the link state information can be sent to the routing calculation unit in standby mode thereby minimizing internal traffic between the active and standby units. Also it allows an efficient flooding system resulting in conserving bandwidth and speeding the router.

47. Regarding **claim 40**, the modified invention of Tsukakoshi, Basso, and Fukushima as taught above disclosed the aforementioned invention including the existence of an LSA entity. It also disclosed that the LSA entity **(LSA entity is simply the ability to handle LS protocol at the forwarding unit)** is responsive to LS information received from any I/O controller **(i.e. forwarding unit)** and being able to transmit the LSA message including the LS information to a remote routing device. **(Fukushima, Column 7, Lines 30-45)**

Response to Arguments

48. Applicant's arguments filed on 13 March 2006 have been fully considered but they are not persuasive.

49. Applicant's arguments with respect to independent claims 1 and 23 in Section B of the Remarks, dependent claim 22 in Section C of the Remarks, and dependent claims 26-29 in Section D of the Remarks have been considered but are moot in view of the new ground(s) of rejection. Specifically Basso and Ichinohe teach a scalable router where each protocol computing entity can have a unique protocol.

50. Applicant's arguments with respect to independent claim 35 in Section E of the Remarks have been considered but are moot in view of the new ground(s) of rejection. Specifically Anderson teaches authenticating and filtering from the routing layer using different protocols including BGP.

51. Applicant's arguments with respect to claims 38 and 41 in Section F of the Remarks have been considered but are moot in view of the new ground(s) of rejection. Specifically Basso now teaches a link state protocol can independently be run on a protocol computing entity. Applicant correctly points out on page 31 in lines 7-8 of the Remarks that Fukushima describes a Link State Database in the routing layer maintained by the routing calculation unit. However, Applicant argues that Fukushima forwarding process units fails to maintain an LS database as claimed in claim 38. Examiner respectfully disagrees with Applicant's position. Fukushima shows a routing table 19 in Figure 2 located in the forwarding process units. The routing table 19 is populated from the LS DB 22 in the routing layer. Since the routing table is effectively a

database and contains Link State information derived from the routing layer, the routing tables in the forwarding process units can be viewed as a Link State DB.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following US and European Patent Application describes a multiple virtual router with a controlling entity:

European Patent Application (EP 0 926 859 A2) to Scott et al

US Pub. No. (2002/0141378) to Bayes et al

The following US Patent describes policy management:

US Patent (5, 889, 953) to Thebaut et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571 272 3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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